

Single P-Channel MOSFET

DESCRIPTION

STP2301S is the P-Channel MOSFET, this advanced trench technology to provide excellent $R_{DS(ON)}$. This devices are well suited for high efficiency fast switching applications, low in-line power loss are needed in small outline surface mount package.

PART NUMBER INFORMATION

STP 2301 S - TR G
 a b c d e

- a : Company name.
- b : Product Serial number.
- c : Package code S: SOT-23
- d : Handling code TR: Tape&Reel
- e : Green produce code G: RoHS Compliant

FEATURES

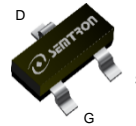
$V_{DS}=-20V$, $I_D=-3A$

$R_{DS(ON)}=80m\Omega(Typ.)@V_{GS}=-4.5V$
 $R_{DS(ON)}=105m\Omega(Typ.)@V_{GS}=-2.5V$

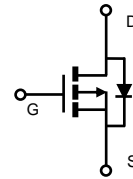
- ◆Fast switch

APPLICATIONS

- ◆Hend-Held Instruments
- ◆Battery Powered Systems



SOT-23



ABSOLUTE MAXIMUM RATINGS ($T_A=25^\circ C$ Unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	± 12	V
I_D	Continuous Drain Current	$T_A=25^\circ C$	-3.0
		$T_A=70^\circ C$	-2.8
I_{DM}	Pulsed Drain Current ^B	-10	A
P_D	Power Dissipation ^A	$T_A=25^\circ C$	1.0
		$T_A=70^\circ C$	0.7
T_J	Operation Junction Temperature	-55/150	$^\circ C$
T_{STG}	Storage Temperature Range	-55/150	$^\circ C$

THERMAL RESISTANCE

Symbol	Parameter	Typ	Max	Units
$R_{\theta JA}$	Thermal Resistance Junction to Ambient ^A	$t \leq 10s$	85	$^\circ C/W$
	Thermal Resistance Junction to Ambient ^{AC}	Steady-State	125	

ELECTRICAL CHARACTERISTICS (T_A=25°C Unless otherwise noted)

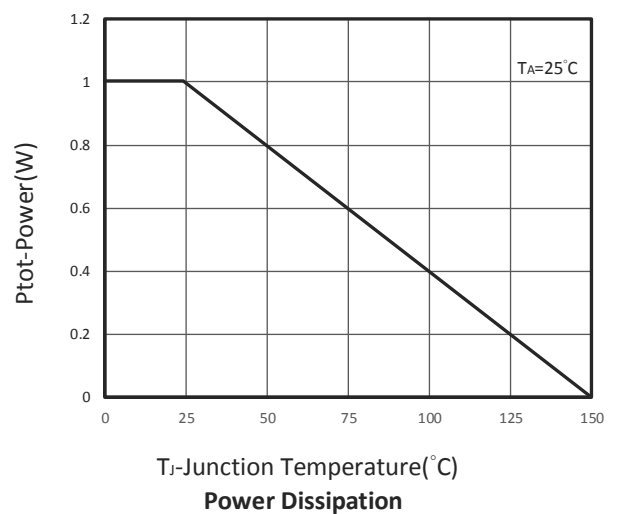
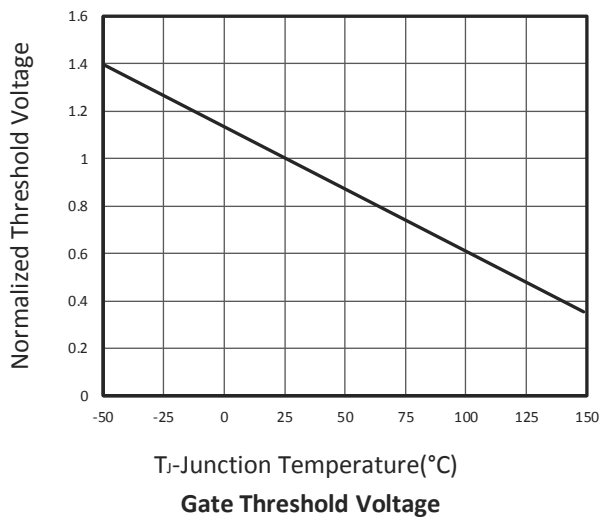
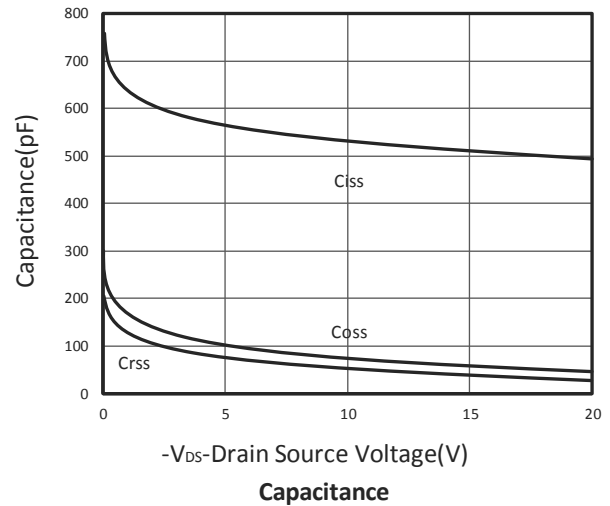
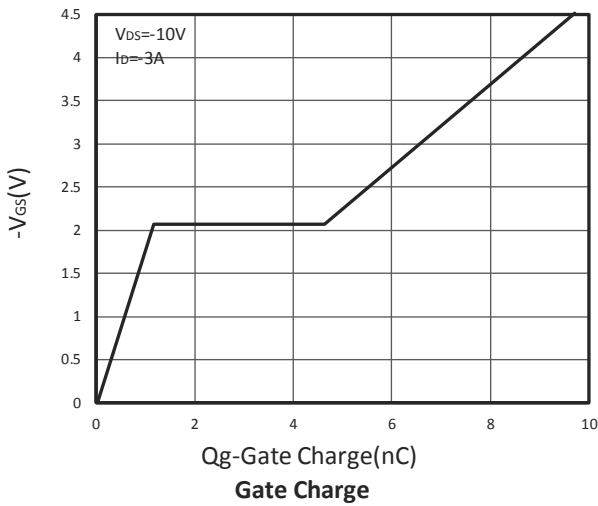
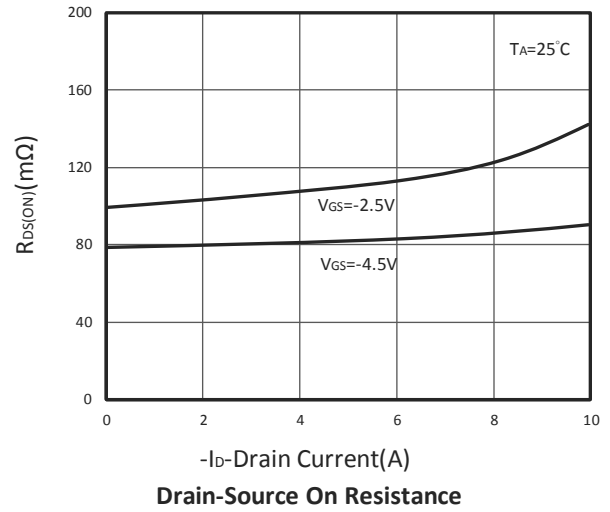
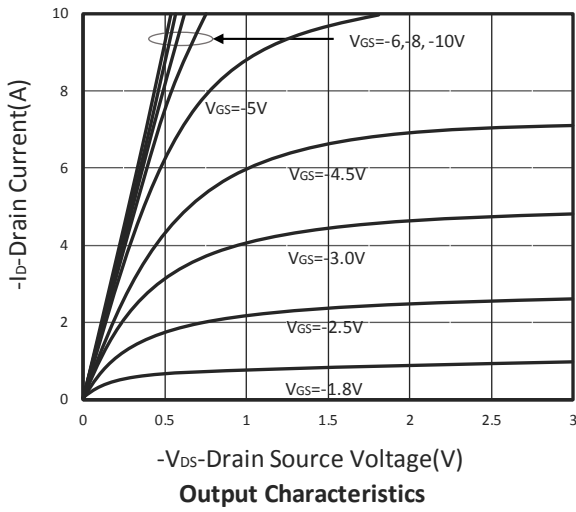
Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
B _{VDS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250μA	-20			V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250μA	-0.5	-	-1.2	V
I _{GSS}	Gate Leakage Current	V _{DS} =0V, V _{GS} =±12V			±100	nA
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-20V, V _{GS} =0V, T _J =25°C			-1	μA
		V _{DS} =-16V, V _{GS} =0V, T _J =75°C			-5	
R _{DS(ON)}	Drain-source On-Resistance ^D	V _{GS} =-4.5V, I _D =-3.0A		80	98	mΩ
		V _{GS} =-2.5V, I _D =-2.0A		105	130	
G _{fs}	Forward Transconductance	V _{DS} =-5V, I _D =-3A		2.5		S
Diode Characteristics						
V _{SD}	Diode Forward Voltage ^D	I _S =-1A, V _{GS} =0V		-0.7	-1	V
I _S	Diode Continuous Forward Current				-6	A
Dynamic and Switching Parameters^E						
Q _g	Total Gate Charge	V _{DS} =-10V, V _{GS} =-4.5V, I _D =-3.0A		9.4		nC
Q _{gs}	Gate-Source Charge			1.2		
Q _{gd}	Gate-Drain Charge			3.5		
C _{iss}	Input Capacitance	V _{DS} =-10V, V _{GS} =0V, f=1MHz		521		pF
C _{oss}	Output Capacitance			81		
C _{rss}	Reverse Transfer Capacitance			56		
t _{d(on)}	Turn-On Time	V _{DD} =-10V, V _{GEN} =-4.5V, R _G =3.3Ω, I _D =-1A		7.2		nS
t _r				16		
t _{d(off)}	Turn-Off Time			21		
t _f				9		

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

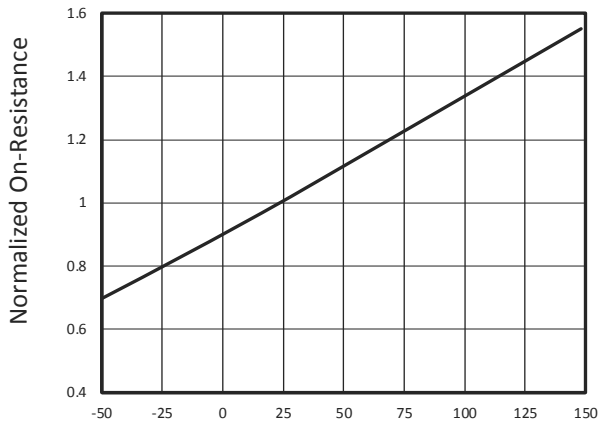
- A. Surface mounted on FR4 board using 1 in² pad size.
- B. Pulsed width limited by maximum junction temperature, T_{J(MAX)}=150°C.
- C. Using ≤ 10s junction-to-ambient thermal resistance is base on T_{J(MAX)}=150°C.
- D. Pulse test width ≤300μs and duty cycle ≤ 2%.
- E. Guaranteed by design, not subject to production testing.

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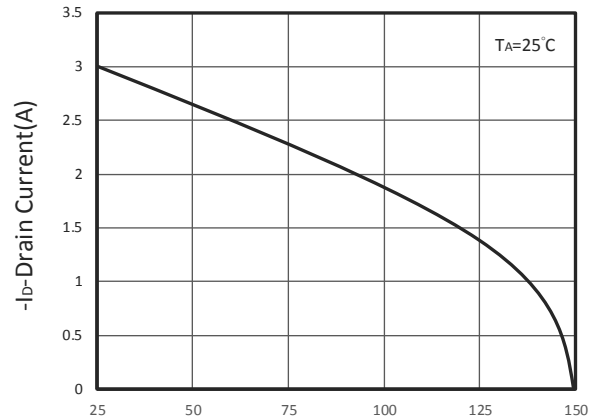
TYPICAL CHARACTERISTICS



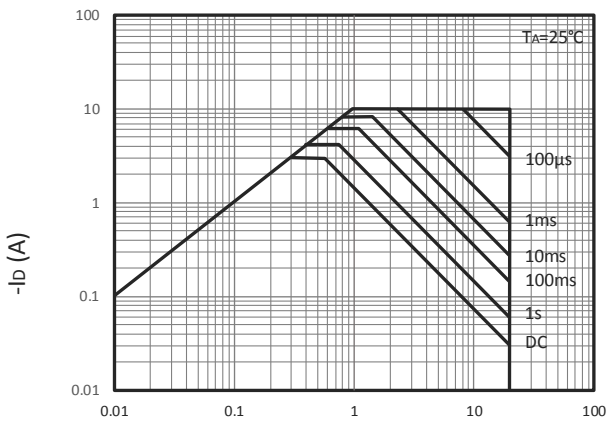
TYPICAL CHARACTERISTICS



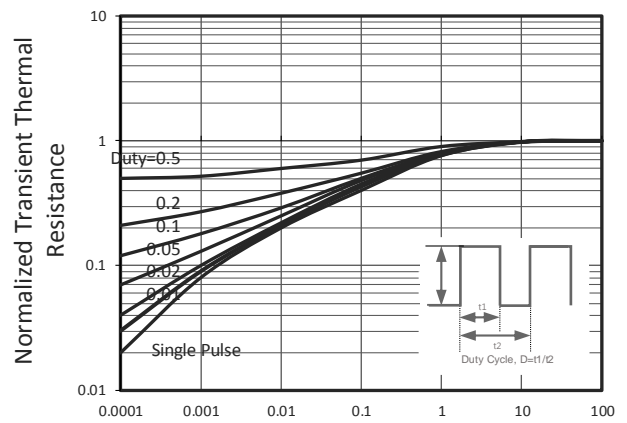
T_J-Junction Temperature(°C)
Drain-Source On Resistance



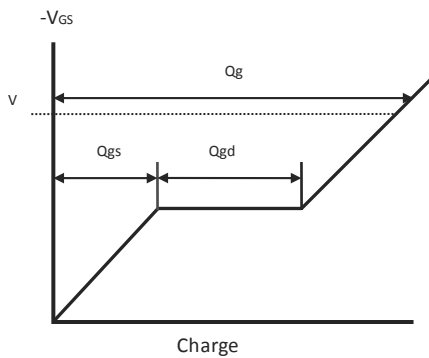
T_J-Junction Temperature(°C)
Drain Current vs T_J



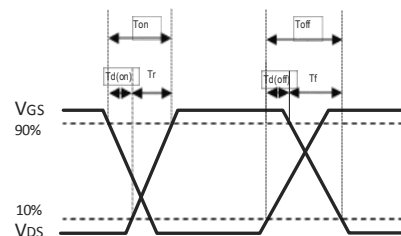
-V_{DS} Voltage (V)
Maximum Safe Operation Area



Square Wave Pulse Duration(Sec)
Thermal Transient Impedance

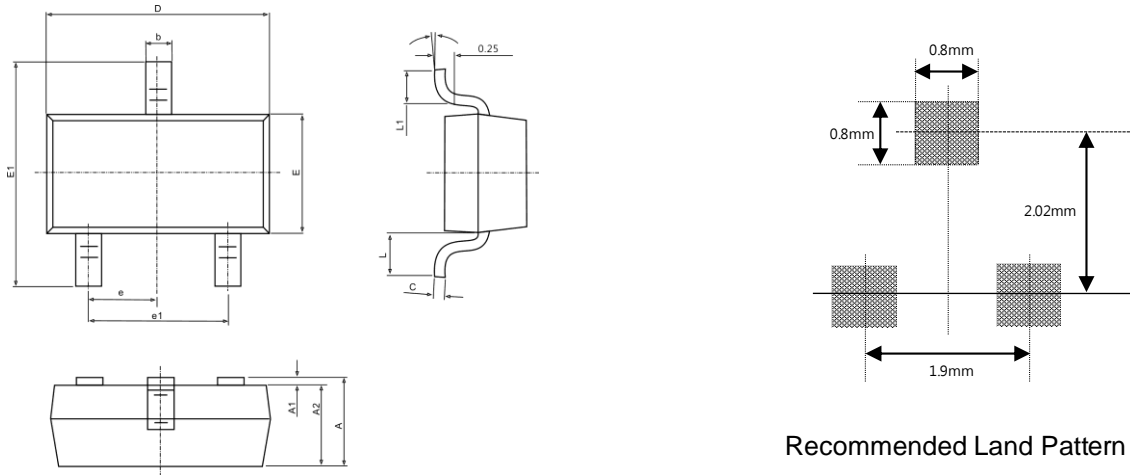


Gate Charge Waveform



Switching Time Waveform

SOT-23 PACKAGE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°